

Claims

What is claimed is:

1. A flat panel display arranged in a matrix of N rows and M columns comprising:
 - a first surface containing an anode thereon, said anode comprising:
 - a plurality of electrically conductive areas each associated with a row (N) and a column (M) defining a pixel location;
 - a phosphor layer associated with each of said pads;
 - a TFT circuit operable to apply a predetermined voltage to an associated area, said TFT circuit, comprising:
 - a first and second electrically cascaded transistors; and
 - a capacitor electrically connected between a output of said first transistor and an output of said second transistor; and
 - a cold cathode, deposited on a second surface, facing said first surface, comprising:
 - a conducting layer disposed on said second surface; and
 - an emitter material disposed on said conducting layer operable to emit electrons when an associated threshold voltage is exceeded.
2. The display as recited in claim 1, further comprising:
 - a grid interposed between said anode and said cathode.
3. The display as recited in claim 2, wherein said cathode further comprises
 - a second conducting layer electrically isolated from said emitter material, said second conductive layer operating as a gate to extract electrons from the

- emitter material when a potential difference between said second conductive layer and emitter material exceeds said threshold voltage
4. The display as recited in claim 2 wherein a potential difference between said grid and said conducting layer exceeds said threshold voltage.
 5. The display as recited in claim 3, wherein a potential applied to said first grid is less than a potential difference between said conducting layer and said second conductive layer.
 6. The display as recited in claim 2, further comprising:

a second grid interposed between said grid and said anode.
 7. The display as recited in claim 6, wherein said second grid potential is less than said grid potential.
 8. The display as recited in claim 1, wherein said first surface is optically transparent.
 9. The display as recited in claim 1, wherein said conductive areas are optically transparent.
 10. The display as recited in claim 1, wherein said second surface is optically transparent.
 11. The display as recited in claim 11, wherein said second surface is selected from the group consisting of: silicon, poly-silicon, amorphous silicon.
 12. The display as recited in claim 1, wherein said emitter material is distributed throughout said cathode, wherein electrons are emitted from an edge of said emitter material.

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13. The display as recited in claim 1, wherein said emitter material is an alpha-carbon.
14. The display as recited in claim 1, wherein said emitter material is composed of a plurality of carbon nanotubes.
15. The display as recited in claim 1, wherein said conducting layer is substantially optically transparent.
16. The display as recited in claim 1, wherein said predetermined voltage is in the range of 20-30 volts.
17. The display as recited in claim 1, further comprising:
a plurality of spacers electrically isolating said anode and said cathode.
18. The display as recited in claim 17, wherein a space between said first surface and said cathode is evacuated.
19. The display as recited in claim 1, wherein said phosphor layer material is operable to emit photons of a known wavelength.
20. The display as recited in claim 1, wherein said phosphor material is operable to emit photons having a color selected from the group consisting of: red, green, blue.
21. The display as recited in claim 1, further comprising:
means to selectively apply a first potential to each of said N rows;
means to selectively apply a second potential to each of said M columns.
22. The display as recited in claim 1, wherein said first input of said first device is in electrical communication with one of said N rows, said second input of said first

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device in electrical communication with one of said M columns, said output of said second device in electrical communication with said associated area.

23. A display comprising:

an anode deposited on a first surface arranged in a matrix of N rows and M columns comprising:

a plurality of electrically conductive areas;

a phosphor layer associated with each of said areas;

a TFT circuit operable to apply a predetermined voltage to an associated areas;

a first grid;

a cold cathode facing said anode deposited on a second surface, said cold cathode comprising:

an emitter material operable to emit electrons when a threshold voltage is exceeded; and

a conducting layer underneath said emitter material deposited on said second surface;

a plurality of spaces electrically isolating said anode, first grid and cold cathode, creating a space between said anode and cathode. wherein a vacuum is created within said space.

24. The display as recited in claim 23, further comprising:

means to apply a potential to said first grid, wherein a potential difference between said first grid potential and a conducting layer potential exceeds said threshold voltage.

25. The display as recited in claim 23, wherein said cathode further comprises:
a second conducting layer electrically isolated from said emitter material.
26. The display as recited in claim 25, further comprising:
means to apply a potential to said second conducting layer, wherein a potential difference between said second conducting layer potential and the conducting layer potential exceeds said threshold voltage.
27. The display as recited in claim 25, wherein said first grid potential is less than said second conducting layer potential.
28. The display as recited in claim 23, further comprising:
a second grid, positioned between said first grid and said anode.
29. The display as recited in claim 28, further comprising:
means to apply a potential to said second grid wherein said potential is less than said first grid potential.
30. The display as recited in claim 23, wherein said predetermined voltage is in the range of 20-30 volts.
31. The display as recited in claim 23, wherein said emitter material is distributed throughout said cathode.
32. The display as recited in claim 23, wherein said emitter material is composed of a plurality of carbon nanotubes.
33. The display as recited in claim 23, wherein said emitter material is an alpha-carbon having an edge.

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34. The display as recited in claim 23, further comprising:
- means to selectively apply a first potential to each of said N rows; and
- means to selectively apply a second potential to each of said M columns.
35. The display as recited in claim 23, wherein said first surface is optically transparent.
36. The display as recited in claim 23, wherein said second surface is optically transparent.
37. The display as recited in claim 27, wherein said cathode is positioned between said anode and an optically transparent surface.
38. A flat panel display having an anode and a cathode, said display arranged in a matrix of N rows and M columns, wherein the intersection of a row and column constitutes a pixel, in combination therewith the improvement comprising:
- a cold cathode for emitting electrons to be directed to said anode,
- and a TFT circuit for each pixel, said circuit employing first and second active devices in cascade and each coupled between an associated row (N) and column (M) to define a pixel at said location M and N and when activated operative to attract said emitted electrons to said pixel location.